3-Position Rotary Table
MSZ Series
Size: 10, 20, 30, 50

How to Order

High precision type MSZA 10 A – M9BW

Basic type MSZB 10 A – M9BW

Number of auto switches

Nil	2 pcs.
n	"n" pcs.

Size

10
20
30
50

Auto switch

Nil	Without auto switch (Built-in magnet)

A	With adjustment bolt

Applicable Auto Switches/Refer to pages 929 to 983 for detailed auto switch specification.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9PV	M9P	●	●	●	○	○		
				2-wire	12 V		M9BV	M9B	●	●	●	○	○	—	
	Diagnostic indication (2-color display)			3-wire (NPN)	5 V, 12 V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)			M9PWV	M9PW	●	●	●	○	○		
				2-wire	12 V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)	5 V, 12 V		M9NAV*1	M9NA*1	○	○	●	○	○	IC circuit	
				3-wire (PNP)			M9PAV*1	M9PA*1	○	○	●	○	○		
				2-wire	12 V		M9BAV*1	M9BA*1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	A93V*2	A93	●	●	●	●	—	—	Relay, PLC
							100 V or less	A90V	A90	●	—	●	—	—	IC circuit	

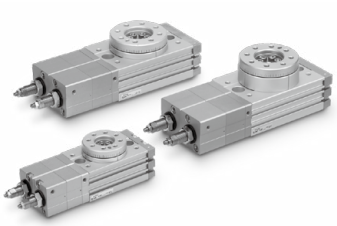
*1 Although it is possible to mount water resistant type auto switches, note that the rotary actuator itself is not of water resistant construction.
*2 1 m type lead wire is only applicable to D-A93.

* Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

* Auto switches marked with a "○" are produced upon receipt of orders.

* Refer to pages 970 and 971 for the details of solid state auto switch with pre-wired connector.

* Auto switches are shipped together, (but not assembled).



Specifications

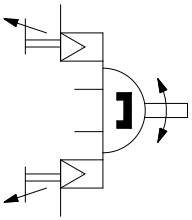
Size	10	20	30	50
Fluid	Air (non-lube)			
Maximum operating pressure	1 MPa			
Minimum operating pressure	0.2 MPa			
Ambient and fluid temperature	0 to 60°C (with no freezing)			
Cushion	None			
Rotation angle adjustment range	0 to 190°			
Center position adjustment range	±10°			
Port size	M5 x 0.8			

Allowable Kinetic Energy and Rotation Time Adjustment Range

Size	Allowable kinetic energy (J)	Rotation time adjustment range for stable operation (s/90°)
10	0.007	0.2 to 1.0
20	0.025	
30	0.048	
50	0.081	

Note) If operated where the kinetic energy exceeds the allowable value, this may cause damage to the internal parts and result in product failure. Please pay special attention to the kinetic energy levels when designing, adjusting and during operation to avoid exceeding the allowable limit.

Symbol



Weight

Unit: g

Size	10	20	30	50
Basic type	700	1300	1670	2570
High precision type	730	1400	1790	2730

Note) Excluding the weight of auto switches.

Piping and Speed Conrol

1) A single 3-position pressure center solenoid valve or two 3-port solenoid valves are used. (Refer to Figure 1 or Figure 2.)
2) A meter-out-type speed controller is used for ports **A** and **B** and a meter-in speed controller is used for ports **C** and **D**.
(Figures 1 and 2 show the state at which pressure is applied to ports **B** and **D**.)

Figure 1 **3-position pressure center solenoid valve: 1 pc.**

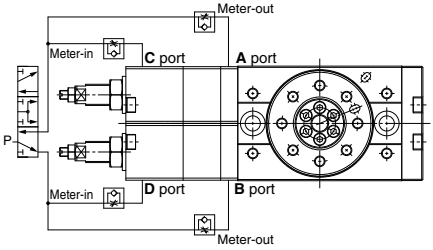
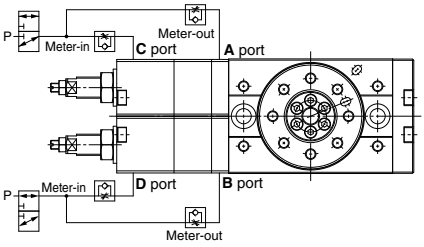


Figure 2 **3-position solenoid valve: 2 pcs.**



∗ The table return position under the power-off state changes depending on the solenoid valve type. Please refer to page 375 for details.

3) Figure 3 shows the rotation range and Table 1 shows the active speed controller.

Figure 3 **Each operational contents**

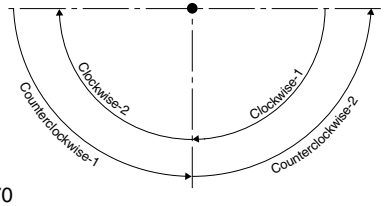


Table 1 **Pressure port and active speed controller**

Operating	Pressure port		Speed controller
	A, C	**B, D**	
Clockwise-1	●	●	**C** port
Clockwise-2	●	—	**B** port
Counterclockwise-1	●	●	**D** port
Counterclockwise-2	—	●	**A** port

Angle Adjustment

1) Stop positions are adjusted with the adjusting bolts shown in Figure 4.
   ① Adjusting bolts “a” and “b” are used for adjusting the rotation ends. Adjusting bolts “c” and “d” are used for adjusting the center position.
   ② Figure 5 shows angle ranges adjusted with each adjusting bolt.

2) Angle adjustment
   Supply air when adjusting the angle
   (a low pressure of approx. 0.2 MPa is recommended).
   ① First adjust both rotation end positions.
   - Apply pressure to ports A and C to adjust adjusting bolt “b”.
   - Apply pressure to ports B and D to adjust adjusting bolt “a”.
   - Lock the bolts with fixing nuts after adjustment.

   ② Next, apply pressure to ports A to D to adjust the center position.
   - Loosen the fixing nuts for adjusting bolts “c” and “d”.
   - Tighten adjusting bolts “c” and “d” almost completely (allowing manual table rotation).
   - Follow the appropriate procedure (R or L) shown in Table 2.

Figure 4 Adjustment bolt position

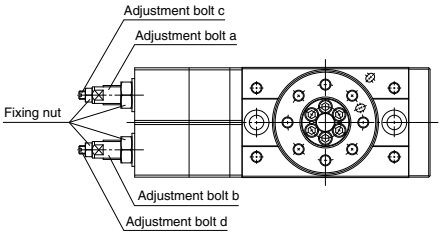


Figure 5 Angle adjustment Range

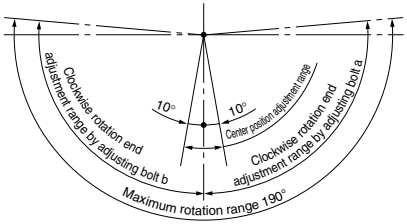


Table 2 Center position adjustment

	R: Clockwise adjustment	L: Counterclockwise adjustment
1	Manually rotate the table counterclockwise until resistance is felt.	Manually rotate the table clockwise until resistance is felt.
2	Rotate the table clockwise when adjustment bolt “d” is loosened. Set it to the desired position.	Rotate the table counterclockwise when adjustment bolt “c” is loosened. Set it to the desired position.
3	Loosen adjustment bolt “c” until resistance is felt. (Make sure that there is no rotation backlash in the table.)	Loosen adjustment bolt “d” until resistance is felt. (Make sure that there is no rotation backlash in the table.)
4	Tighten both adjustment bolts “c” and “d” to approx. 45°. Note 1)	Tighten both adjustment bolts “c” and “d” to approx. 45°. Note 1)
5	Lock adjustment bolts “c” and “d” with fixing nuts. Note 2)	Lock adjustment bolts “c” and “d” with fixing nuts. Note 2)

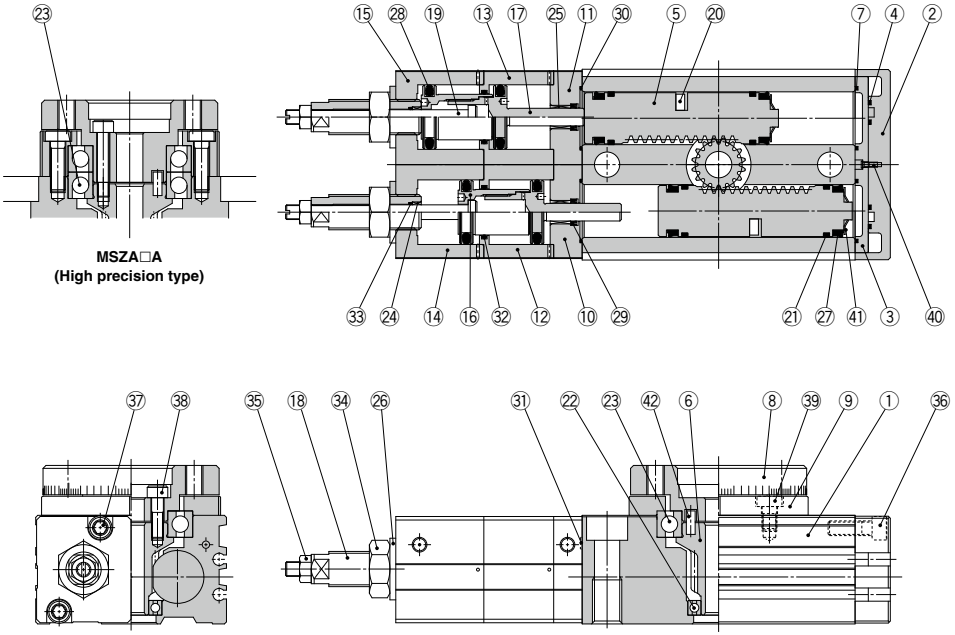
Note 1) Since the position of the adjustment bolt shifts with changing the screw clearance, pre-tighten the fixing nuts.
Note 2) If the table has a rotation backlash after tightening the nut, readjust it.

Adjusting angle per rotation of angle adjustment screw

size	Adjustment bolt a, b (End position adjustment)	Adjustment bolt c, d (Center position adjustment)
10	10.2°	5.1°
20	9.0°	3.6°
30	8.2°	3.3°
50	8.2°	4.1°

A piping, speed control, and angle adjustment manual is attached to the product.

Construction



MSZA□A
(High precision type)

Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Cover**	Aluminum alloy	Nickel plated
3	**Plate**	Aluminum alloy	Chromated
4	**Seal**	NBR	
5	**Piston**	Stainless steel	
6	**Pinion**	Chrome molybdenum steel	
7	**Gasket (for cover)**	NBR	
8	**Table**	Aluminum alloy	Anodized
9	**Bearing retainer**	Aluminum alloy	Anodized
10	**End cover A**	Aluminum alloy	Anodized
11	**End cover B**	Aluminum alloy	Anodized
12	**Cylinder tube A**	Aluminum alloy	Anodized
13	**Cylinder tube B**	Aluminum alloy	Anodized
14	**Tube cover A**	Aluminum alloy	Anodized
15	**Tube cover B**	Aluminum alloy	Anodized
16	**Sub piston R**	Carbon steel	Nickel plated
17	**Sub piston F**	Carbon steel	Nickel plated
18	**Adjustment bolt R**	Carbon steel	Nickel plated
19	**Adjustment bolt F**	Carbon steel	Nickel plated
20	**Magnet**	—	
21	**Wear ring**	Resin	
22	**Bearing**	Bearing steel	

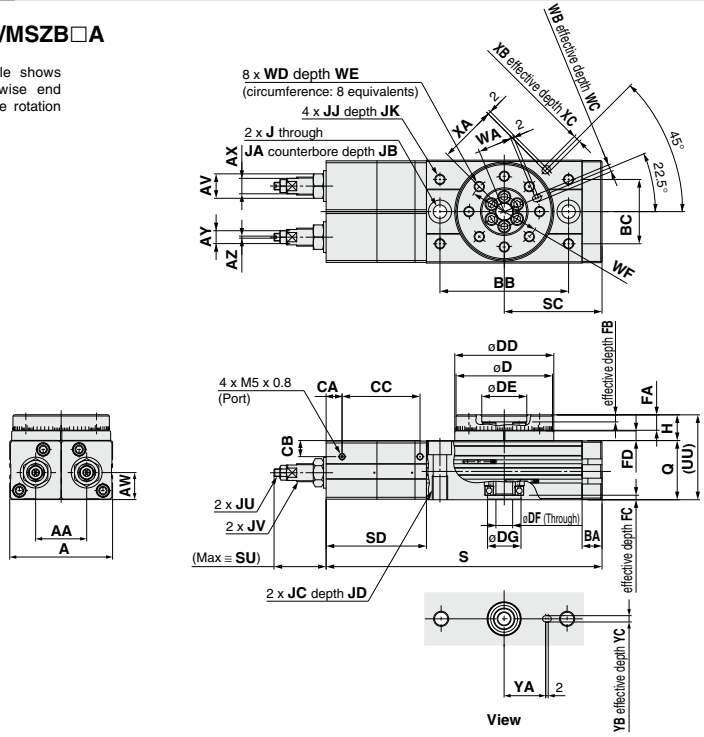
No.	Description		Material	Note
23	**Basic type** / High precision type	**Bearing** / **Angular bearing**	Bearing steel	
24	**Bushing**		—	
25	**Bushing**		—	
26	**Seal washer**		NBR	
27	**Piston seal**		NBR	
28	**Piston seal**		NBR	
29	**Rod seal**		NBR	
30	**Gasket**		NBR	
31	**O-ring**		NBR	
32	**O-ring**		NBR	
33	**O-ring**		NBR	
34	**Compact hexagon nut**		Steel wire	
35	**Hexagon nut**		Steel wire	
36	**Hexagon socket head set bolt**		Stainless steel	
37	**Hexagon socket head set bolt**		Stainless steel	
38	**Hexagon socket head set bolt**		Stainless steel	
39	Round head phillips screw	**Size: 10**	Stainless steel	
	Hexagon thin socket head bolt	**Size: 20, 30, 50**	Chrome molybdenum steel	
40	**Round head phillips screw No.0**		Steel wire	
41	**Push nut**		Stainless steel	
42	**Parallel pin**		Carbon steel	

∗ The component parts cannot be shipped individually.

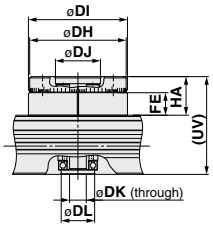
Dimensions

Basic type/MSZB□A

The position table shows the counterclockwise end when adjusted the rotation angle to 180°.



High precision type/MSZA□A



(mm)

Size	DH	DI	DJ	DK	DL	FE	HA	UV
10	45h8	46h8	20H8	6	15H8	10	18.5	52.5
20	60h8	61h8	28H8	9	17H8	15.5	26	63
30	65h8	67h8	32H8	12	22H8	16.5	27	67
50	75h8	77h8	35H8	13	26H8	17.5	30	76

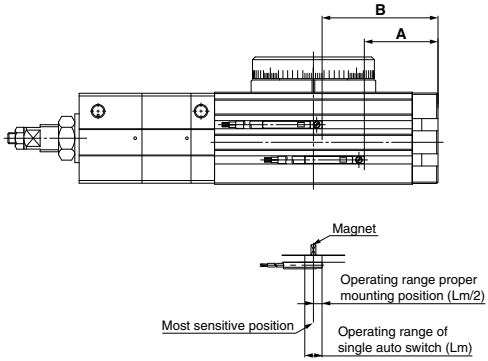
(mm)

Size	AA	A	AV	AW	AX	AY	AZ	BA	BB	BC	CA	CB	CC	D	DD	DE	DF	DG	FA	FB	FC	FD	H	J	JA	JB
10	24.7	50	14	17	8	7	1	9.5	60	27	7	7	38	45h9	46h9	20H9	6	15H9	8	4	3	4.5	13	6.8	11	6.5
20	32.4	65	17	18.5	10	8	1.2	12	76	34	8.1	10	50.4	60h9	61h9	28H9	9	17H9	10	6	2.5	6.5	17	8.6	14	8.5
30	34.7	70	17	18.5	10	8	1.2	12	84	37	10.5	10.5	53.5	65h9	67h9	32H9	12	22H9	10	4.5	3	6.5	17	8.6	14	8.5
50	39.7	80	19	21	12	10	1.6	15.5	100	50	12.4	12.5	60.6	75h9	77h9	35H9	13	26H9	12	5	3	7.5	20	10.5	18	10.5

(mm)

Size	JC	JD	JJ	JK	JU	JV	Q	S	SC	SD	SU	UU	WA	WB	WC	WD	WE	WF	XA	XB	XC	YA	YB	YC
10	M8 x 1.25	12	M5 x 0.8	7	M4 x 0.5	M10 x 1	34	132.5	46	50	27.3	47	15	3H9	3.5	M5 x 0.8	8	32	27	3H9	3.5	19	3H9	3.5
20	M10 x 1.5	15	M6 x 1	8	M5 x 0.5	M12 x 1.25	37	168.5	58.5	63.5	39	54	20.5	4H9	4.5	M6 x 1	10	43	36	4H9	4.5	24	4H9	4.5
30	M10 x 1.5	15	M6 x 1	8	M5 x 0.5	M12 x 1.25	40	184	63.5	69	36.4	57	23	4H9	4.5	M6 x 1	10	48	39	4H9	4.5	28	4H9	4.5
50	M12 x 1.75	18	M8 x 1.25	8	M6 x 0.75	M14 x 1.5	46	214.5	76	78	42.4	66	26.5	5H9	5.5	M8 x 1.25	12	55	45	5H9	5.5	33	5H9	5.5

Proper Auto Switch Mounting Position



Size	Rotation	Solid state auto switch D-M9□ (V), D-M9□W (V)				Reed auto switch D-A9□, D-A9□V			
		A	B	Operating angle θ m	Hysterisis angle	A	B	Operating angle θ m	Hysterisis angle
10	190°	31	49	37°	5° or less	27	45	53°	10° or less
20	190°	39	66	33°	5° or less	35	62	50°	10° or less
30	190°	43	72	29°	5° or less	39	68	43°	10° or less
50	190°	53	87	22°	5° or less	49	83	33°	10° or less

Operating angle θ m: Value of the operating range Lm of a single auto switch converted to an axial rotation angle.
Hysteresis angle: Value of auto switch hysteresis converted to an angle.
Note) Since the above values are only provided as a guideline, they are not guaranteed.
In the actual setting, adjust them after confirming the auto switch operating condition.

Detection of the Center Position

The appropriate mounting position of the center position detection auto switch is between dimensions A and B, as shown above. However, since the auto switch turns on in the range of the operating angle (θ m), when one auto switch is used for detecting the center position, the auto switch turns on long before reaching the center position, as shown in the left figure below.
To avoid this, use two auto switches (as shown in the right figure below) so that the rotation may be detected from both the clockwise rotation end to the center position and from the counterclockwise rotation end to the center position.

Center position detecting auto switch: 1 pc. **Center position detecting auto switch: 2 pcs.**